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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/520,342

01/05/2005

Michael John Sinclair

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FERRELLS, PLLC

P. O. BOX 312

CLIFTON, VA 20124-1706

EXAMINER

BOYKIN, TERRESSA M

ART UNIT

PAPER NUMBER

1711

DATE MAILED: 09/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/520,342

Applicant(s)

SINCLAIR, MICHAEL JOHN

Examiner

Terressa M. Boykin

Art Unit

1711

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4-20-06 (3)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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**Priority**

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

**Abstract missing**

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). **An abstract on a separate sheet is required.**

Applicant is reminded of the proper language and format of an Abstract of the Disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 250 words. The printer will no longer accept Abstracts that are more than 25 lines, regardless of the number of words. The form and legal phraseology often used in patent claims, such as "means" and "said", should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases, which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Applicants claims are directed to a flame retardant composition which comprises a mixture of a phosphorus containing compound which decomposes to produce phosphoric acid when exposed to flame and an oxygenated thermoplastic heterocyclic resin which is prepared by reacting an urea of the general formula (1) as claimed in claim 1.

**35 USC 112, Second Paragraph**

Claims 8 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 wherein the blowing agent may be melamine **or** urea does not appear to be consistent with claim 1 wherein the urea is stated in the positive and is definitely present. It is understood that Claim 1 neither limits nor requires the component urea to be a blowing agent, however, the claim is open to be interpreted in this manner rendering the language of claim 8 as inconsistent.

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-7, 9, 11- 16, 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5110850 see abstract, cols. 1-6, and claims 4, 5 and 6.**

**US 5110850** relates to thermoplastic polyurethane compositions rendered flame r retardant by the use of derivative free melamine.

Specifically, the reference relates to halogen-free flame retardant thermoplastic polyurethane compositions. The compositions are comprised of a non-foam thermoplastic polyurethane and melamine free of any derivative with no additional flame retardants.

Compositions of polyurethanes and melamine, free of any derivatives, are prepared with melamine as the sole flame retardant additive. The resulting compositions are flame retardant, in terms of oxygen index and UL-94 classification, are devoid of halogen-containing species and are non-blooming.

The thermoplastic polyurethanes of the present invention are free of blowing agent, free of crosslinking agents, and/or blowing agent additives and *melamine* acts as the sole flame retardant.

Also, suitable herein are dialkylcarbonates, cycloaliphatic carbonates, and diarylcarbonates. The dialkylcarbonates can contain 2 to 5 carbon atoms in each alkyl group and specific examples thereof are diethylcarbonate and dipropylcarbonate. Cycloaliphatic carbonates, especially dicycloaliphatic carbonates, can contain 4 to 7 carbon atoms in each cyclic structure, and there can be one or two of such structures. When one group is cycloaliphatic, the other can be either alkyl or aryl. On the other hand, if one group is aryl, the other can be alkyl or cycloaliphatic. Preferred examples of diarylcarbonates, which can contain 6 to 20 carbon atoms in each aryl group, are diphenylcarbonate, ditolylcarbonate, and dinaphthylcarbonate.

The reference utilizes a derivative-free melamine, which is the common name for 2,4,6-triamino-1,3,5-S-triazine. The melamine of the reference does not include derivatives of melamine, and is typically used in an amount of 30 to 40 percent by weight melamine based on TPU, and preferably 33 to 38 percent by weight based on TPU. Generally amounts less than 30 percent results in the loss of flame retardant properties, seen by a drop in oxygen index. Amounts of greater than 40 percent generally degrade the urethane mechanical properties.

The particle size is generally less than 125 microns, desirably less than 62 microns, and the mean size micron is about 2-31 microns with 4-15 being preferred. Any size melamine can be used, but preferably super fine is used to impart a smoother surface to the extruded, molded parts.

The resulting TPU composition which is actually a blend or mixture of the TPU and the melamine tends to have values for oxygen index of greater than 30 and preferably about 32 or greater (measured using the standard procedure ASTM D-2863). The TPU /melamine composition generally achieves a V-O classification when tested according to the UL-94 vertical burn test.

In addition to the above, other conventional additives can be added such as antioxidants, antiozonates, light stabilizers, and talc which is known as a nucleating agent. However, it is an important aspect that the composition of the present invention is free of any flame retardants whatsoever, e.g. halogen flame retardants and non-halogen flame retardants, e.g. antimony oxide, with the sole exception being melamine.

The thermoplastic urethane component and the melamine is compounded by any means known to those skilled in the art and the literature. Preferably the thermoplastic urethane is melted at a temperature of about 150-200.degree. C., desirably from about 160.-190.. C. and preferably from about 170.-180.. C., but the temperature depends on the particular TPU used. The TPU pellets and melamine powder are blended to form a physical mixture. The physical mixture is then fused in a mixing device, preferably a twin screw extruder. This results in the melamine being well dispersed throughout the TPU matrix. The compositions formed are non-blooming, i.e. the powder is well-dispersed

and does not reside solely on the surface.

The TPU resin was dried at 80.. C. for 16 hours prior to use. Melamine crystal (ground or superfine) was used as received. The black concentrate (25 percent carbon black/75 percent polyether TPU) was dried at 80.degree. C. for 16 hours prior to use.

The desired amounts of ingredients were weighed into a suitably sized polyethylene bag, then shaken thoroughly to prepare the physical blend. The physical blend was then melt blended in a counter-rotating twin screw compounding extruder. During compounding, the melt temperature was typically 175.degree.-180.degree. C.; and the screw RPM revolutions per minute were 40. The resulting strands were chopped, then compression molded to measure flammability properties. Recipes and flammability properties are summarized in Table I.

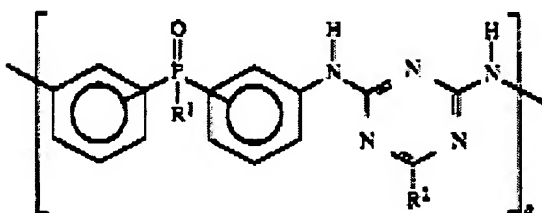
A physical mixture of polyether TPU (64 percent by weight) and superfine melamine crystal (36 percent by weight) was prepared in a ribbon blender. The mixture was then melt blended in a co-rotating twin screw extruder equipped with a strand die head containing 8 holes, each of 1/4" diameter; the physical mixture was fed into the extruder by using an Acrison loss-in-weight continuous screw/auger feeder. The screw revolutions per minute were 90. The zone temperatures were as follows: Zone 2, 130.degree. C.; Zone 3, 180.degree. C.; Zone 4, 140.degree. C., and Zone 5, 135.degree. C.

The strands were pelletized, then extruded on a 1 1/4" single screw extruder as 6: wide, 30 mil thick cast strip. The strip had a smooth surface appearance. Physical properties were measured either on the cast strip or compression molded plaques. Properties are summarized in Table II. See also TABLE I.

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**Claims 1-21 are rejected under 35 U.S.C. 102( b) as being anticipated by US 5158999 see abstract, cols. 1-5, claim 1, and Tables I and II.**

**US 5158999** discloses compounds having a nucleus of general formula (I)



R<sub>2</sub> represents



where R<sub>3</sub> represents an alkyl group comprising up to 20 carbon atoms or an aryl nucleus comprising up to 10 carbon atoms, or R<sub>sup.2</sub> represents a heterocyclic ring nucleus comprising from 4 to 8 ring atoms, at least one atom comprising nitrogen and linking the ring nucleus to the triazine ring. Compounds of formula (I) are suitable for use as a flame retardant additive for polymer materials, particularly when used in combination with a second and different source of phosphorus. The flame retarded polymers are particularly suitable for use in wire and cable insulation, dimensionally recoverable products, molded parts, extruded tubings, pipes and tape type constructions. (note applicants' claims 19-21 regarding compression molding and extruding).

The use of phosphorus based retardants is known, particularly the use of inorganic phosphates to generate intumescent formulations, which cause the formation of a protective foamed char when exposed to heat thereby preventing further combustion. Such formulations have generally found applications in cellulosic type materials, resins and formulations containing low molecular weight polyols for paints and other such



coating materials.

Alternative compounds have now been found which are suitable for use in a flame retardant additive for polymer materials having reduced smoke generation, reduced evolution of corrosive gas and improved flammability properties. The compounds are compatible with a variety of polymers applicable for wire and cable insulation, heat recoverable items and molded parts.

The compounds of formula (I) are suitable for use as flame retardant additives in polymer materials particularly when used in combination with a second and different source of phosphorus resulting in an additive having reduced smoke generation, reduced evolution of corrosive gas and improved flammability properties. The compounds are compatible with a variety of polymers applicable for wire and cable insulation, heat recoverable items and molded parts.

The flame retardant additives for polymer materials and in particular to non-halogen containing compounds suitable for use as flame retardant additives for *polyolefin* and other types of polymers. In a further aspect this invention also relates to a method of synthesis of the compounds. Note applicants' claims 17 and 18.

Compounds of formula (I) are phosphorus/nitrogen containing oligomers (P/N oligomers) comprising a number of repeating units, the number of which is defined by n.

The P/N oligomers of general formula (I) have a particular utility in a flame retardant additive suitable for use in polymers, especially polyolefin polymers. The additive is formulated by blending a compound of formula (I) with a source of phosphorus.

The second source of phosphorus may comprise any inorganic or organic phosphorus source known to the art, which does not deleteriously alter the properties of the polymer to which it is added. Preferred examples of the phosphorus source comprise ammonium polyphosphate (commercially available under the trade name Phoscheck P30 from

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Monsanto), melamine phosphate (commercially available under the trade name Amgard NH from Albright and Wilson) and red phosphorus. The phosphate source may optionally be encapsulated, e.g., in a water-insoluble resin. A preferred example is ammonium polyphosphate in melamine formaldehyde.

The weight ratio of phosphorus source to P/N oligomer (I) is dependent on the flammability of the polymer composition, which is to be flame retarded and the level of flame retardance to be achieved but preferably is from 4:1 to 1:4 and more preferably from 2:3 to 1:4.

The particle size of the P/N oligomer and the phosphorus source is important both for flammability performance and for the physical properties of the flame retarded polymer material. Preferably both additive components have an average particle size of less than 80  $\mu\text{m}$ , more preferably less than 40  $\mu\text{m}$ . Conventional methods to obtain these particle sizes include sizing using sieves, ball milling and jet milling. Alternatively during the preparation of the P/N oligomers of formula (I) precipitation of the final product can be optimized to minimize particle size.

Surface treatments may be used to increase the coupling between the flame retardant additive composition and its polymer host matrix. Materials such as zircoaluminates and titanates can be used or, more commonly, silane coupling agents.

Polymer materials comprising flame retardant additives of the present invention can be processed using conventional methods, e.g., mixing by Banbury or two-roll mill and extruded or molded either by compression or injection methods. The flame retarded polymers are particularly suitable for use in wire and cable insulation, dimensionally recoverable products, especially heat recoverable products, molded parts, extruded tubings, pipes and tape type constructions where high levels of flame retardancy together with evolution of low quantities of smoke and corrosive combustion products

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are required. (note applicants' claims 19-21 regarding compression molding and extruding).

Examples 1 to 15 describe polyolefins and flame retardant additives are compounded either using a steam heated Farrel Bridge two-roll mill at 140.. C. for LDPE and 90.. to 100.. C. for EEA or mixed using a Brabender Plasticorder Torque rheometer, with a 30 centimeter internal mixing head, for two minutes at 100.degree. C. (EEA) and 140.. C. (LDPE). Test pieces were produced by compression molding using a Gem hydraulic press. Conditions employed were 110 C. for ten minutes (EEA) and 150.. C. for twenty minutes (LDPE) with twelve ton pressure. In Example 15, representative epoxy formulations consisting of and 2,4,6-tris (dimethylaminomethyl) phenol (2:1) and flame retardant additives were mixed by hand and cured at 90.degree. C. for 30 minutes and at 110 C. for 18 hours. All percentage loadings parts and ratios are by weight unless otherwise stated.

\* Variation of Compound A (as prepared in Example 1)/APP (Phoscheck P30) ratio at a 40% flame retardant loading in EEA (BP LE186EA, melt index 6, EA content 18%) shows that according to UL94, Compound A blended in a 2:3 ratio with APP outperforms a Spinflam MF82 (Montefluos) formulation in EEA. A 2:3 ratio of Compound A blended with encapsulated APP (Exolit 462, Hoechst-Celanese) is also V-0 rated. (note applicants claim 10 regarding encapsulation).

**Claims 1-21 are rejected under 35 U.S.C. 102( b) as being anticipated by US 5312853 see abstract, cols.1-6, TABLES 1, 2, 6-7.**

USP 5312853 discloses flame-retardant polymeric compositions, preferably thermoplastic and especially *polyolefin*-based compositions, containing an intumescent flame-retardant system substantially comprised of a phosphorus component and an organic nitrogen component. The flame-retardant system is more particularly comprised of ammonium polyphosphate and tris-(2-hydroxyethyl) isocyanurate. Specifically, the reference relates to flame-retardant polymeric compositions, especially to thermoplastic compositions, particularly based on polyolefins, containing an intumescent flame-retardant system comprised substantially of a phosphorus component and an organic nitrogen component. Note applicants claims 17 and 18 with regard to polyolefins.

More specifically, the reference is directed to a two-component system, consisting of ammonium polyphosphate (APP) and tris-(2-hydroxy-ethyl)-isocyanurate (THEIC) imparts very good flame-retardant properties to polyolefins. The reference states that this was more particularly an unexpected result as the other components of the three-component systems specified hereinabove when used in a two-component system with ammonium polyphosphate did not have any flame-retardant activity whatsoever (cf.

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comparative Examples 1-12 herein) and the Scarso reference teaches that poor mechanical and thermal properties would be expected of this two component (APP-THEIC) system.

The flame-retardant polymeric compositions, are thermoplastic compositions and more especially polyolefin-based compositions containing an intumescent flame-retardant system comprised substantially of a phosphorus component and an organic nitrogen component. The flame-retardant system of the invention is a two-component mixture consisting substantially of ammonium polyphosphate and tris-(2-hydroxyethyl) isocyanurate. The flame-retardant system preferably consists of from about 80 to 50 weight percent ammonium polyphosphate and from about 20 to about 50 weight percent tris-(2-hydroxyethyl) isocyanurate. The flame-retardant system is used in a flame-retardant quantity to reduce the flammability of the base polymer; preferably in an amount of 15 to 40 weight percent based on the total weight of the flame-retardant polymer composition.

The flame-retardant polymer composition is further characterized in that the ammonium polyphosphate contains 0.5 to 25 weight % of:

- a) a water-insoluble artificial, preferably cured, resin encapsulating the individual ammonium polyphosphate particles;
- b) a reaction product of a polyisocyanate with a carbodiimidization catalyst, the polycarbodiimide formed encapsulating the individual ammonium polyphosphate particles;
- c) a reaction product of a polyisocyanate and a polyhydroxy compound, the polyurethane formed encapsulating the individual ammonium polyphosphate particles;
- d) a reaction product of a polyisocyanate with a trimerization catalyst, the polyisocyanurate formed encapsulating the individual ammonium polyphosphate particles;
- e) a reaction product of a polyisocyanate and water, the polyurea formed encapsulating the individual ammonium polyphosphate particles;

f) a cured melamine/formaldehyde-resin, the melamine/formaldehyde resin encapsulating the individual ammonium polyphosphate particles;

g) a cured epoxide resin, the epoxide resin encapsulating the individual ammonium polyphosphate particles.

The ammonium phosphate component of the invention is exemplified by the free flowing, pulverulent, sparingly water-soluble ammonium polyphosphates of the formula  $(\text{NH}_4 \text{PO}_3)_n$  in which n stands for an integer from about 200 to 1000, preferably about 700, with a particle size such that more than 99 weight percent of the particles have a size of less than 45  $\mu\text{m}$ . An example of such polyphosphates is "Exolit 422" having the composition  $(\text{NH}_4 \text{PO}_3)_n$ , in which n is higher than 200.

The flame-retardant polymer compositions can contain from 15 to 40 weight percent of the two-component, flame-retardant mixture. The two component, flame retardant system contains from about 50 to about 80 weight percent of ammonium polyphosphate and from about 20 to 50 percent by weight of tris-(2-hydroxyethyl) isocyanurate. Preferably the ammonium polyphosphate component is present in the two component system in an amount from about 65 percent to about 80 percent by weight and tris-(2-hydroxyethyl)-isocyanurate is present in an amount of about 20 percent to about 35 percent by weight; most preferably 75 to 80 percent by weight of ammonium polyphosphate and about 20 to about 25 percent of tris-(2-hydroxyethyl) isocyanurate.

Preferably, the amount of ammonium polyphosphate used in the flame retardant compositions of the invention is at least about 20 percent by weight based upon the total weight of the flame retardant polymer composition and the ratio (weight basis) of ammonium polyphosphate to tris-(2-hydroxyethyl) isocyanurate is at least about 2:1; most preferably at least about 3:1 to about 4:1 and no more than about 5:1. We have found that the two component flame retardant composition should comprise at least about 30 percent by weight of the flame retardant polymer composition; preferably

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about 35 percent.

Any of the various polymer or polymer compositions may be treated, both thermoplastic and thermoset, for instance a polyolefin, like polyethylene, polypropylene, polybutylene-1, and poly-4-methylpentene-1; a copolymer of one or more olefins, like a crystalline copolymer of ethylene and propylene, a rubber-like copolymer of ethylene, propylene and cyclopentadiene as the third monomer, and other elastomeric materials such as polyesterpolyether copolymers, thermoplastic polyurethanes; a homo- and copolymer of alkenylaromatic compounds, such as polystyrene and polymethylstyrene; a copolymer of an alkenyl-aromatic compound and butadiene and/or acrylonitrile, such as rubber-like styrene-butadiene copolymer, a copolymer of styrene and acrylonitrile or a graft copolymer of styrene and/or acrylonitrile on polybutadiene (ABS resin); acrylic polymers, like polyethyl acrylate and polymethylmethacrylate; a cellulose derivative, such as cellulose acetate and cellulose nitrate; a phenolformaldehyde resin; a urea-formaldehyde resin; a melamine-formaldehyde resin; a polyamide; a polyester, (thermoplastic and thermoset); polyvinylchloride; polyformaldehyde; butyl rubber, polyisoprene and other kinds of rubber; an epoxy resin; a polycarbonate, etc. and mixtures or blends thereof. Excellent results are attained with polymers such as polyolefins.

With regard to claims 19-21, the polymer compositions of the reference may be prepared by conventional methods. It is preferable that the flame retardants and other additives be dispersed in the polymer as uniformly as possible. Therefore, any of the known methods which are suitable for obtaining a uniform dispersion may be used. In accordance with one method, the additives may be added to the particulated polymer which can be optionally mixed to obtain a uniform blend; the mixture or blend is melt-blended in an extruder, and formed into pellets. In another method, the powdered or ground polymer and flame-retardant additives may be uniformly mixed and formed into

tablets by conventional methods. A blend of the tablets may be fed to an extruder for melt mixing and pelletizing. The blend may also be directly fed to a molding machine such as screw injection molding machine. Alternatively, a master batch pellet or particle containing a high concentration of the flame-retardant additive compounds and low concentration of polymer may be prepared on a roll mill or a mixing extruder. The master batch pellets may be then blended with the polymer and processed as described above.

The reference discloses in Example 1:

5000 g of HOSTALEN\* PPU 0180 P--a polypropylene powder having a melt index MFI 230/5 of about 55 g/10 minutes; 1500 g of EXOLIT\* 422--a fine particulate, sparingly water-soluble ammonium polyphosphate of the formula  $(\text{NH}_4)_n(\text{PO}_3)_n$ , in which n is about 700 and more than 99% of the particles have a size of less than 45  $\mu\text{m}$ ; 500 g of melamine; 100 g of KRONOS\*\* CL 220--a titanium dioxide pigment (rutile grade); 10 g calcium stearate; 10 g of HOSTANOX\* SE 03--an antioxidant based on polynuclear phenols, and 10 g of HOSTANOX\* PAR 24--an aromatic phosphite [tris-(2,4-ditertbutylphenol) phosphite].

The above ingredients were mixed in an intensive mixer (20 l capacity), extruded at 180.degree.-200.degree. C. in a laboratory extruder (20 mm screw diameter) and granulated in a laboratory granulator. The dried, granulated material was introduced into a steam-heated compression molding press and molded at a temperature of 195.degree. C. and under a pressure of 2-3 bars (5-10 minutes) or 300 bars (2 minutes) into test plates 1.6 mm thick and 3.2 mm thick.

The procedure of Example 2 was repeated but the melamine was replaced by 1000 g of melamine cyanurate. The results of the flammability tests are listed in Table 2.

The procedure of Example 3 was repeated but the melamine was replaced by 1500 g of melamine cyanurate. The results of the flammability tests are listed in Table 2.

With regard to claims involving the encapsulation, note that the reference discloses that the EXOLIT\* 462 is a microencapsulated ammonium polyphosphate made by the process described in German Specification DE-OS 35 31 500, containing about 10 weight % of encapsulating material consisting of a cured melamine/formaldehyde resin. (note applicants claim 10 regarding encapsulation).

The comparative materials melamine, cyanuric acid, melamine cyanurate and melamine/formaldehyde-resin (MADURIT\* MW 909) were found in the flammability tests to be definitely unsuitable for use in two-component system with ammonium

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polyphosphate as a flame-retardant composition for thermoplastic materials; (cf. Table 1 and 2).

In clear contrast therewith, the ammonium polyphosphate/tris-(2-hydroxyethyl) isocyanurate composition was very effective (cf. Tables 3 and 4). Specimens 3.2 mm thick made from material in which 35 parts of this composition were used per 100 parts of polypropylene could be classified in class UL 94 V-0.

A flame-retardant polymer composition, containing an intumescent flame-retardant system consisting essentially of ammonium polyphosphate and tris-(2-hydroxyethyl) isocyanurate wherein said ammonium polyphosphate is present in an amount of at least about 20 percent by weight based upon the total weight of said polymer composition and wherein the ratio of ammonium polyphosphate to tris-(2-hydroxyethyl) isocyanurate on weight basis is at least about 2:1 and wherein the said ammonium polyphosphate contains 0.5 to 25 weight % of a reaction product of a polyisocyanate with a carbodimidization catalyst, the polycarbodiimide formed encapsulating the individual ammonium polyphosphate particles. (note applicants claim 10 regarding encapsulation).

Note also claims 5-15 of the reference.

Applicants' claims are so broadly set forth that the claim continues to be interpreted by the Examiner as anticipated by the references while remaining within the scope of the specification. Thus, each of the references discloses a flame retardant composition prepared from the same components as claimed by applicants herein. Since the disclosed amounts and percents, i.e. % by weight, etc are expressed differently, they nevertheless appear to overlap those claimed. to distinguish over the prior art. In view of the above, there appears to be no significant difference between the

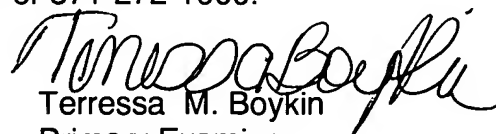


reference(s) and that which is claimed by applicant(s). Any differences not specifically mentioned appear to be conventional. Consequently, the claimed invention cannot be deemed as novel and accordingly is unpatentable.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terressa M. Boykin whose telephone number is 571 272-1069. The examiner can normally be reached on Monday-Thursday 10-5:30 Friday (work at home).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Terressa M. Boykin  
Primary Examiner  
Art Unit 1711